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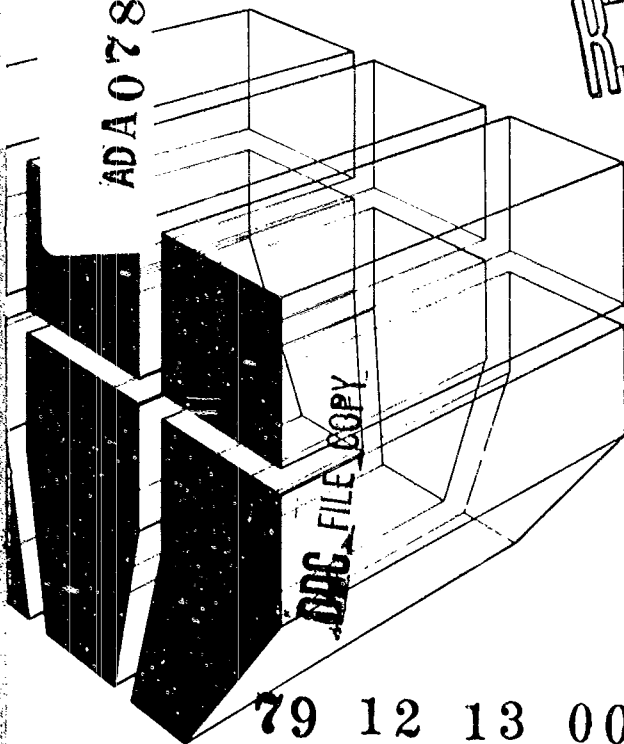
TECHNICAL REPORT E-156
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HABITABILITY IMPROVEMENTS FOR
AIRCRAFT CARRIER MESSDECKS

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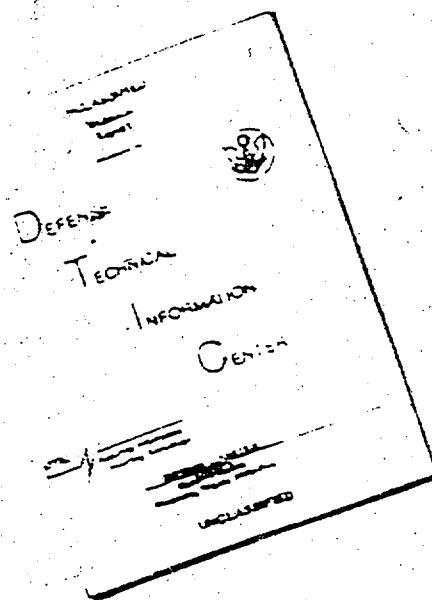
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other U.S. Navy carriers. The components were designed to improve the crew's perception of privacy, efficiency, comfort, and dining area image. Surveys of the crew after these improvements had been implemented indicated positive user response to the modifications.

FOREWORD

This research was conducted during 1977 and 1978 as a continuation of the Department of Defense Food Research, Development, Test and Engineering Program started in 1970 for garrison food service systems. The research was performed by the Energy and Habitability Division (EH) of the U.S. Army Construction Engineering Research Laboratory (CERL) under DA Form 2544 No. DRXNM 77-138, dated 2 March 1977. The overall project was sponsored by the Navy Food Service Systems Office (NAVFSSO), Washington, DC. The management of the total project was assigned to the Operations Research and Systems Analysis Office of the U.S. Army Natick Research and Development Command (NARADCOM), Natick, MA. NARADCOM personnel had overall responsibility for the systems analysis, concept formulation, total system design, implementation, and evaluation.

All work was performed onboard the U.S.S. Saratoga (CV-60). Appreciation is expressed to the many officers and crew who helped develop design information and evaluated the messdeck environments. The contributions of the following personnel are acknowledged: CDR Reed, Ships Supply Officer and CWO Dave Cox, the ship's Food Service Officer (Navy); Mr. Richard Richardson (U.S. Army Natick Research and Development Command), Project Manager; Robert Saxler (CERL) and Keith Knapp (CERL), design; Wayne Veneklasen (CERL), occupant evaluation; and Robert Doerr and Robert Neathammer (CERL), statistical coding and analysis.

Mr. R. G. Donaghy is Chief of CERL-EH. COL L. J. Circeo is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.

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HABITABILITY IMPROVEMENTS FOR AIRCRAFT CARRIER MESSDECKS

1 INTRODUCTION

Background

The aircraft carrier is an extremely sophisticated weapons system made up of high-technology equipment and run by advanced-skill crew. Since most ships of the U.S. Navy carrier fleet were designed and built before most of the equipment currently onboard was developed, the ships are nearly always undergoing renovation, which usually requires additional equipment and crew. In addition, the use of high-technology equipment requires highly skilled personnel, who have many other career options. An increasingly crowded environment has made shipboard living less attractive, and such conditions of poor habitability have been cited as a major contributor to the problem of retaining shipboard personnel.¹

The "habitability" of an environment can be operationally defined as the impact of the physical components on the behavior of the user occupants. Physical conditions that contribute to desired occupant behavior can be considered as creating positive habitability, or as having a positive impact on the users. Physical conditions that inhibit desired occupant behavior can be considered as creating negative habitability, or as having a negative impact on the users.

The U.S.S. Saratoga (CV-60), a ship in the U.S. Navy carrier fleet, was designed during the early 1950s and launched in 1955. Thus, as a weapon system of equipment and crew, the ship has a 25-year-old environment. Several on-going conditions relating to the quality of the Saratoga's messdecks are considered to be negative habitability factors.

1. The Saratoga's personnel requirements have increased approximately 25 percent since the early 1950s, so that the two galley and messdeck areas that were originally designed to handle approximately 2550 persons now need to accommodate approximately 3800.

2. Weight and space constraints have required that the crew messdeck areas also be designed to be the primary open areas for aircraft weapon assembly during training exercises and General Quarters.

¹ J. F. Castle, The Shipboard Habitability Design Process (ASE-NASSC, Navy Department, 1977).

Several weapon elevators, with their accompanying control equipment, must be continuously available, and therefore are a visual part of the messdeck environment.

3. Finally, the Saratoga messdecks are a part of the main fore and aft circulation, so the port and starboard sides of all eating spaces are also passageways for the general movement of crew.

These messdeck conditions (as well as berthing and work station conditions) are evaluated by individuals near the end of their tours of duty and are probably a consideration in their decision whether to re-enlist on a carrier.

Purpose

The purpose of this research was to design and evaluate messdeck layouts and other physical components that would minimize the negative impacts of high density, multi-use of spaces, and nondiner passageway circulation through dining spaces on the carrier Saratoga.

Approach

The research was conducted in three phases: (1) designing the improvements, (2) conducting a user survey to evaluate the improvements, and (3) recommending implementation of the improvements in accordance with the user evaluations.

Design of Improvements

The messdeck improvement designs (Chapter 2) were based on a three-part investigation:

1. Designer observation of messdeck conditions during peak use periods
2. Designer interviews with four enlisted men
3. Survey questionnaire responses regarding general messdeck environmental items from approximately 440 men.

User Evaluation of Improvements

The user-occupant evaluation of the messdeck improvements (Chapter 3) was derived from a questionnaire given to approximately 500 persons which surveyed specific messdeck environmental items before and after making the improvements. Four categories of typical user-occupant habitability requirements were investigated: (1) privacy, (2) efficiency, (3) comfort, and (4) image; in addition, other environmental conditions

such as light level, ventilation, and ambient temperature were investigated. The before/after user-occupant evaluations were compared in two ways:

1. The net percentage of persons who responded negatively to particular environmental components
2. The gross percentage of persons who responded positively or were neutral to particular environmental components.

Implementation of Improvements

Researchers analyzed the user-occupant evaluations and used this information as recommended implementations of the various physical components introduced to the messdeck spaces (Chapter 4). Use of these improvements on other U.S. Navy aircraft carriers will be monitored by the U.S. Navy Food Service Systems Office (NAVFSSO).

2 DESIGN OF IMPROVEMENTS

NAVFSSO and NARADCOM selected the Saratoga's forward messdeck spaces as the location for testing and evaluating a prototype food-service system intended to improve crew enjoyment of meals. Two general surveys conducted by NARADCOM had already indicated that an average of approximately two-thirds of the crew surveyed who were using both the forward and aft messdecks² considered the food service a negative habitability factor (see Appendix A). When specifically asked about the forward messdeck eating spaces, 61 percent indicated that the physical surroundings on the messdeck (colors, furniture, texture, etc.) did make their meals more enjoyable (see Appendix C).³ CERL conducted a three-part investigation to obtain the necessary information for designing physical component modifications that the majority of the crew would consider an improvement. The desired degree of improvement was that the majority of the crew would not continue to evaluate the messdeck environment negatively.

Design Information

Three methods were used to obtain messdeck habitability design information:

1. Direct observations by designers of messdeck environmental conditions during peak use periods
2. Comprehensive interview with four Saratoga enlisted men
3. Survey questionnaire responses from approximately 440 Saratoga enlisted men about general environmental items.

These three methods were intended to complement rather than duplicate each other, so that both the conditions of the forward messdeck environment and the crew's general response to those conditions could be identified. The three conditions creating the habitability problems could not be changed: (1) increased crew size, (2) required multi-use of messdeck areas for assembly, and (3) dynamic passageway circulation of nondiners. Possible solutions to these problems were (1) assigning more ship compartments as messdecks, (2) assembling weapons elsewhere, or (3) rerouting nondiner circulation to adjoining compartments; none of these were feasible. Therefore, the three-part search for design

² NARADCOM Saratoga Food Service Opinion Survey (March 1977), reported in "A New Foodservice System for Aircraft Carriers": NARADCOM Technical Report, in press.

³ CERL Saratoga "Food Service Improvement Program" Survey (November 1977).

information was oriented to *modifying* the negative impact of the unchangeable problem conditions.

Designer Observations

The designer ate nine meals (three each of breakfast, lunch, and supper) at various locations in the forward messdeck spaces (see Appendix B). Observation times selected were during the peak use of the meal periods, with full complement crew and airwing personnel on board while the ship was in the Mediterranean 1 through 3 March 1977. The following assessments were made:

1. The dining experience necessarily involves a sequence of spaces, so some "designed organization," such as a strong color, pattern, or texture theme, might establish a continuity.
2. The bulkhead and overhead ship items dominate the compartment image or character of the eating areas, giving the diner the effect of eating at his workstation.
3. There is a need for several smaller dining "spaces," since the existing messdeck compartments are a part of the dynamic passageway circulation.
4. Approximately one-third of the space now assigned for crew seating is not needed, because the food is "poorly prepared,"* and many of the crew therefore do not eat at the forward messdecks; however, the final design will use the entire space available, assuming that improved meal quality will attract more crew there.
5. Essentially only one option of table size (capacity of six or seven persons) is currently available. Including two- and four-person tables would provide a greater choice of seating for the crew, and would provide seating in areas where there currently is none, since the larger tables will not fit.
6. While there appears to be no way to "cover" the overhead visual distractions of ducts, piping, and hoists because of the vertical dimension limitation (many items now are 6 ft, 5 in. from the deck), painting the entire overhead a dark, nonreflective color would possibly minimize that condition.
7. Many dining areas are near weapon assembly equipment and elevators, which requires all food service items in those areas to be easily movable and constructed to withstand dynamic usage.

* According to statements of other diners.

8. Tables located too close to the beverage dispensers and salad/condiment bar have created a traffic bottleneck.

Overall, these shipboard conditions have created a different kind of design problem than normally found in shore-based garrison dining facilities. The high density and occupant numbers require a primary "task performance" design solution. That is, at shore-based facilities, the lower density and occupant numbers mean that table size and degree of privacy can be changed primarily to accommodate user satisfaction; physical limitations onboard a ship, however, dictate the addition of various table sizes to create more dining opportunities as related to the configuration of the compartments, not primarily personnel satisfaction and/or choice.

Personnel Interview

After having eaten four meals at the forward messdeck, the designer held a 2-hour interview with four enlisted crew members: a Seaman, a Third Class Petty Officer, a Second Class Petty Officer, and a First Class Petty Officer. The purpose of the interview was to orient the designer to broad issues related to the total shipboard living situation, particularly the foodservice, that currently concern enlisted personnel. Following are some specific comments related to foodservice experiences in the messdeck areas:

1. Getting food takes so long that the meat is often cold. Sometimes it also takes a few minutes to find a seat, which makes the situation worse.
2. Holding General Quarters and other drills during meal time also causes many "unnecessary" cold meals.
3. Waiting time in lines is "perceived" to average approximately 20 minutes at sea, and less time in port. The main activities while waiting in line are reading and talking.
4. A major problem is getting and returning trays and dishes from the scullery. Also, when the dishes come directly from the scullery without being "cooled," hot glasses cause milk to become warm.
5. Some of the messdeck crew need more training to provide improved cafeteria service.
6. The menu is inconsistent. The larger number of crew seems to be a factor in a more limited menu since, for example, storing, preparing, and serving lobster tails for 4000 is "different" than for 200.

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7. The crew should have tablecloths.
8. Reponse was favorable to the new blue and white tile on the deck and to covering some of the pipes on the bulkheads in the messdeck compartments.
9. All the "action" causes the crew to eat too fast; visual barriers would be extremely helpful if they do not interfere with the weapons handling.
10. The First Class Petty Officers should have their own serving line in a "reserved" eating compartment.
11. The dining experience would be better if the whole crew could take pride in their messdeck.
12. All the messdeck space that is available should be used.

General Survey Questionnaire

NARADCOM research personnel collected survey data from approximately 440 enlisted personnel during 1977 while the Saratoga was at sea in the Caribbean. Eleven of the 59 questionnaire items were related to messdeck conditions or the crew's dining experience preferences. Following are the 11 dining-related items and sample crew responses to the situation at that time:

18. Should there be MORE or LESS military atmosphere in your messdeck?

Lot More	More	Little More	Same	Little Less	Less	Lot Less
$\frac{5}{28}$	$\frac{7}{4}$	$\frac{5}{4}$	$\frac{7}{25}$	$\frac{5}{17}$	$\frac{5}{22}$	$\frac{5}{23}$

19. If you would like to see the MILITARY ATMOSPHERE reduced in the mess, how would you do it?

Make the messdeck look like a civilian cafeteria - 61%.
Do not change it - 39%.

22. Please indicate your opinion of the GENERAL CONDITION OF YOUR MESS by circling the number which comes closest to describing your feelings.

1	Mean	7
Too brightly lighted	3.7	Too dimly lighted
Attractive appearance	5.5	Unattractive appearance
Quiet	5.6	Noisy
Uncrowded	5.2	Overcrowded
Colorful	4.8	Not colorful

24. Circle the table size you prefer. (Percentages)

2 person	3%
4 person	69%
6 person	21% (size in use for survey)
8 person	6%
8+ person	1%

36. How would you like a food facility with stand-up counters for easy to eat foods? (Percentages)

	Dislike Greatly	Dislike Moderately	Dislike Slightly	Neither	Like Slightly	Like Moderately	Like Greatly
Breakfast	17	8	14	24	15	9	13
Lunch	10	5	7	19	19	18	22
Dinner	19	10	12	25	15	10	9

45. How would you describe the ship's enlisted mess? (Percentages)

	Very Bad	Bad	Slightly Bad	Neither	Slightly Good	Good	Very Good
General mess environment	9	13	25	34	13	6	0
Degree of military atmosphere	9	11	23	40	11	4	1
Chance to sit with friends	14	15	25	14	17	9	5
Monotony of same facility	9	16	23	42	5	5	0

46. How often is your mess? (Percentages)

	Almost Never	Not Often	Some-times	Often	Almost Always
Too cold	31	31	26	10	2
Too warm	7	13	25	34	20
Stuffy	4	11	31	37	18
Smoky (cigarettes)	79	13	5	2	0
(smoking is prohibited)					
Full of steam	50	29	14	6	1
Full of unpleasant odors	19	31	30	13	6
Too windy	52	28	14	4	1
Full of fuel smells	22	23	26	17	13

48. How often do you see the following problems?

	Almost Always	Often	Some- times	Not Often	Almost Never
Heavy through traffic	37	40	21	1	0
Dirty decks	4	16	34	38	7
Bomb handling on messdeck	4	17	41	17	20
Loud people on messdeck	25	33	29	12	1

54. What, in your opinion, would be the best way of reducing the waiting times in lines? (Circle 2)

- | | |
|---|-----|
| 1. More emphasis on fast-serve items. | 30% |
| 2. Department schedules for eating. | 9% |
| 3. Set up another serving line. | 19% |
| 4. Put more tables on the messdeck. | 6% |
| 5. Stay open longer hours. | 12% |
| 6. Have take-out items. | 6% |
| 7. New food outlet in another location. | 14% |
| 8. Limit the time men are at the tables. | 1% |
| 9. Remove self-serve items from the line. | 1% |
| 10. Make sure line always has food items. | 3% |

Summary

The three methods of deriving design information provided specific problem statements related to the messdeck users' perceived needs during the dining experience. Similar observations, interviews, and general surveys were conducted on the U.S.S. Kennedy CV-67 during 1977, producing similar messdeck problem statements from the enlisted crew. Table 1 summarizes the forward messdeck problems, as expressed by the crew, in relation to their concerns for privacy, efficiency, comfort, and messdeck image. These problems were considered when generating various design solutions and evaluating the final design solution.

Design Solution

Previous research on enlisted personnel dining facilities at shore-based garrisons developed design guidance recommendations based on user response to surveys.⁴ Various physical components of the dining facility were found to have significantly improved the users' positive opinions of their total dining experience. The following list of physical

⁴ R. L. Porter, et al., U.S. Marine Corps Interior Design Guide for Enlisted Personnel Dining Facilities, Technical Report E-150 (U.S. Army Construction Engineering Research Laboratory [CERL], 1979).

Table 1

(Circled numbers indicate survey question numbers.)

[illegible]

component recommendations from this research was reviewed for possible application to the Saratoga messdeck problems:

1. 40 percent of those surveyed said that the physical surroundings of dining facilities are relevant to their dining (or meal) enjoyment; therefore, it is important to include relevant user/occupant habitability improvements when upgrading a total foodservice program.

2. 50 to 60 percent said they sometimes wanted to eat alone, and approximately 15 percent wanted to eat alone quite often. This indicates a need for approximately 15 percent of the total seating to be two-person tables, since these offer the best opportunity to eat alone, or with only one other person.

3. Approximately 40 percent said they would like to limit the number of other persons seated at their table. This is most easily accomplished by using two-person tables.

4. When a variety of table sizes was available and each person had approximately 400 sq in. of table surface, more than 90 percent of those surveyed said that table sizes were adequate. When only four-person tables were available and each person had 315 sq in. of table surface, approximately 35 percent said that the table size was not adequate.

5. Even though the number of personnel using each dining area did not change, users/occupants consistently perceived the area to be less crowded when fewer persons were visible at any one time:

1. 73 percent feel crowded when up to 300+ people are visible

2. 40 percent feel crowded when up to 150 are visible

3. 30 percent (and less) feel crowded when groups of 60 to 80 are visible.

6. More than 75 percent said that the combination of serving line partitions and dining area booth dividers are adequate to isolate movement activities from the more passive dining experience.

7. 68 percent responded positively to the introduction of the line "Circle-Serv" and "scramble" beverage bar, which provide easier, more direct access to food and drink dispensers. The after-renovation survey listed a 53 percent positive response to the conventional serving line.

8. When more than 300 persons are visible, approximately the same number of persons are bothered by others "milling about" as those who are not (40 percent each). When serving line traffic is partitioned off, the response shifts to approximately 25 percent bothered and 50 percent not bothered. When the dining area itself is separated by booth

backs into areas of 60 to 100 persons, the response shifts to less than 15 percent bothered and approximately 75 percent not bothered.

Based on the four habitability problem areas of the forward messdeck for the Saratoga study, several garrison facility design guidance recommendations were considered, and the following physical component modifications were selected for testing. All were determined applicable within the constraints of shipboard messdeck space limitations and fire safety requirements.

Privacy:

1. Provide visual screens around all dining spaces where extensive passageway traffic also occurs.

Efficiency:

1. Use all three forward messdecks to provide more circulation space at the salad/beverage area and more space between tables.
2. "Indicate" traffic flow with deck tile design.
3. Increase eating places available by adding stand-up counter stations and table seats.

Comfort:

1. Replace rigid plastic shell chairs with more flexible "formed" seat and back chairs.

Image:

1. Establish strong color "image" at the serving line bulkhead, augmented with color-coordinated vision screens, deck tiles, and chairs at the messdecks.
2. "Paint out" the piping and gear at the overhead.

Functionally, the renovation design improved the forward messdeck habitability using 21 removable partition units (see Appendix D) that visually define and separate the dynamic activities from the more passive activity of eating. The amount of crew circulation necessary to obtain the meal, find a place to eat, and return gear to the scullery, plus the fore and aft general passageway traffic directly through the messdecks accentuated the necessarily high occupant density. The renovation design equipped several of the partition units with stand-up counters to provide 20 additional places to eat. Environmentally, the design improved the messdeck habitability by establishing a strong,

unifying color scheme, using three shades of blue, one shade of green, and white. These colors complemented those already being used in the messdecks before the program began and were used on all surfaces (overheads, bulkheads, new partitions, decks) and even accessory gear (trays, food wrappers).

The unifying color scheme was established for the four messdeck compartments; a vivid horizontal stripe and chevron supergraphic was placed on the bulkheads and decks of the galley's two serving lines. The color scheme and graphics will be the sailors' initial environmental awareness that the forward messdeck is a distinct eating area for a "fast-serve" menu. A dominant, distinctive color graphic was used, since parts of the space are also required for General Quarters weapon assembly, and these operations require gear availability. Signs at the beginning of each serving line indicate the specific pre-packaged menu item pick-up location.

In the other three messdeck compartments, the vivid color scheme was continued on the deck tile design in two shades of blue and on the vision screen partitions in two shades of blue and one shade of green. Both surfaces were designed in the stripe and chevron supergraphic motif. Deep blue carpet was to have been used on most of the vertical panels of the vision screen partitions to provide a token amount of noise attenuation material in an otherwise highly sound-reflective steel surface environment; however, it could not be used due to a change in the acceptability of Nomex fiber materials, so the partition surfaces were finished with deep blue plastic laminate. The extensive piping, ductwork, and conduits at the overheads were all painted "out" with a dark black to further "quiet" the spaces.

3 EVALUATION OF IMPROVEMENTS

A 29-item questionnaire was developed by CERL to determine the impact that the physical component modifications had on the user-occupant group (see Appendix C). Four types of items were included: (1) items directly related to the interior design's physical components, (2) items modified indirectly through changes in the interior design, (3) items related to the users' dining needs or attitudes, and (4) items of general satisfaction.

Thirteen items were directly related to modifications to the interior design's physical components (numbers indicate the number of the question or the survey responded to):

1. The noise level in this messdeck is so loud that it bothers you.
6. You usually feel crowded in this messdeck.
8. The size of the table is adequate for your dishes and/or tray.
9. The condition of the furniture (tables and chairs) is excellent.
10. The color of the dining furniture (table tops and chairs) is very satisfactory.
11. The colors throughout this messdeck (tile, bulkheads, overhead) are drab.
12. This messdeck has an adequate number of dividers that separate you from other activities here.
13. This messdeck is arranged so that you can get your food and drinks easily.
14. It is easy to find a place to sit once you have your food and drinks.
16. There are so many pipes, ducts, furniture, checkered tile, etc., that the visual distraction bothers you while you eat.
17. There are so many people milling and walking around that it bothers you while you eat.
19. The chairs in this messdeck are very comfortable.
23. You never have to wait too long in the chow line.

Five items were modified minimally by indirect changes in the interior design:

2. The temperature in this messdeck is usually so hot that it bothers you.

3. The temperature in this messdeck is usually so cold that it bothers you.

4. The amount of light is so low that it bothers you.

5. The amount of light is so bright that it bothers you.

15. The air quality (ventilation) in this messdeck is so bad that it bothers you.

Seven items were related to customers' dining needs or attitudes, not the facility per se:

7. It is important for you to be able to eat by yourself when you want to.

21. It is really the people, not the physical surroundings, that make your meals enjoyable.

22. Other people waiting in the serving line and watching you eat doesn't bother you.

24. You like the idea of having a stand-up counter to eat at.

25. It is important for you to be able to control who and when people sit at the same table with you while you eat.

28. How many of your meals do you like to spend in relatively private conversation with specific friends?

- a. 0 to 20 percent
- b. 21 to 40 percent
- c. 41 to 60 percent
- d. 61 to 80 percent
- e. 81 to 100 percent

29. How many others do you like to have at your table?

- a. 0
- b. 1 to 2
- c. 3 to 4
- d. 5 to 6
- e. Up to 7

Four items related to general satisfaction:

18. This messdeck is so pleasant to be in (not just for eating) that you would rather be here than in your quarters or duty station.

20. The physical surroundings in this messdeck (colors, furniture, texture, etc.) make your meals more enjoyable.

26. Which single item contributes most to making this messdeck a pleasant place to eat? (Select one)

- a. Colors
- b. Furniture
- c. Noise level
- d. The meal
- e. The person I eat with
- f. The activity level

27. Which single item contributes most to making this messdeck an unpleasant place to eat? (Select one)

- a. Colors
- b. Furniture
- c. Noise level
- d. The meal
- e. The person I eat with
- f. The activity level

The evaluation made before the improvements were designed was derived from 484 user/occupants who indicated their attitudes toward the messdeck environment; of these, 61 percent indicated that this was not an enjoyable place to eat. After messdeck physical components were modified to improve the environment related to the negative factors, an analysis of data from a sample of 493 user/occupants indicated that the negative evaluation of the forward messdeck had been reduced to 23 percent (an improvement of 38 percent). Complete before/after percentages of occupant negative and positive responses are listed in Table 2 and in Appendix C.

Specific occupant positive response improvement to items related to the design modifications were all statistically significant at the .01 level, i.e., the difference between responses before and after the modification are significantly different at the 99 percent confidence level. (Two-way contingency tables were analyzed using the Chi-square.) Table 3 shows the percentage responses for those 13 items.

Table 2

Before/After Percentages of Occupant
Positive and Negative Responses

Before Evaluation				After Evaluation			
-%	Neutral	+% (n=484)		-%	Neutral	+% (n=493)	
50	19	31	1. Noise level	27	24	49	
6	20	74	2. Temperature (hot)	4	15	81	
9	21	70	3. Temperature (cold)	6	18	76	
11	18	71	4. Light level (too low)	5	11	84	
4	20	76	5. Light level (too bright)	5	14	81	
88	4	8	6. Feel crowded	74	9	17	
23	27	50	7. Important to "eat by yourself"	28	28	44	
16	8	76	8. Table size adequate	26	8	66	
45	30	25	9. Furniture condition	23	25	52	
24	42	42	10. Furniture color	11	23	66	
51	27	22	11. "Total" color drab	22	26	52	
67	13	20	12. Separation of activities	28	12	60	
65	8	27	13. Ease of getting meal	26	9	62	
72	11	17	14. Easy to find seating	73	11	16	
20	26	54	15. Ventilation quality	13	17	70	
37	27	36	16. "Item" visual distraction	16	21	63	
60	19	21	17. "People" visual distraction	43	24	33	
86	9	5	18. Most "pleasant" place to be	79	16	5	
54	27	19	19. Comfort of chairs	29	31	40	
61	31	8	20. "Total" makes meals enjoyable	23	43	34	
38	32	30	21. People, not environment, important	37	30	33	
38	20	42	22. People "watching" in line no bother	34	22	44	
74	6	20	23. Wait time in chow line	59	9	32	
39	29	32	24. Counter eating	32	22	46	
37	37	26	25. Control who you eat with	32	36	32	

Before and After preference percentages for items 26 through 29 were as follows:

Before		After
26. "Pleasant" contributions		
persons	38%	meal 39%
meal	37%	persons 34%
activity level	8%	colors 8%
noise	8%	noise 7%
colors	5%	activity level 6%
furniture	4%	furniture 6%

Table 2 (cont'd)

Before

After

27. "Unpleasant" contributions

activity level 32%
meal 28%
noise 27%
persons 8%
colors 2%
furniture 2%

activity level 41%*
meal 22%
noise 22%
noise 22%
colors 3%
furniture 2%

28. Extent of private conversations desired

	Before	After
% of time		
80 to 100	24%	23%
60 to 80	22%	24%
40 to 60	24%	24%
0 to 20	17%	13%
20 to 40	13%	16%

29. Number of others desired at same table

	Before	After
1 to 2	28%	49%
3 to 4	59%	45%
5 to 6	6%	2%
7	4%	2%
0	3%	2%

* (Note: The increase in the negative impact of the "activity level" in the "After" condition is probably due to the 100 percent increase in personnel use of the forward messdecks in the improved conditions, even though the eating places could be increased only 50 percent. See last item in Table 4.)

Table 3

Summary of Occupant Response Improvement Related
to Messdeck Habitability Requirements

Habitability Requirements	Specific Factors of the Mess Deck Environment	Before After				Item No.
		-%	+%	-%	+%	
Efficiency	Finding place to eat	72	17	73	16	14
	Ease of obtaining meal	65	27	26	62	13
	Waiting time in chow line	74	20	59	32	23
Privacy	Crowdedness	88	8	74	17	6
	Separation of activities	67	20	28	60	12
	Visual distraction of other people	60	21	43	33	17
Comfort	Chair comfort	54	19	29	40	19
	Noise level	50	31	27	49	1
	Table size	16	76	26	66	8
Image	Furniture condition	45	25	23	52	9
	Visual distraction from physical items	37	36	16	63	16
	Furniture color	24	42	11	66	10
	Color throughout the space	51	22	22	52	11

4 CONCLUSIONS AND RECOMMENDATIONS

The habitability of the Saratoga messdeck area was improved both functionally and environmentally by use of several modifications designed to improve crew perception of privacy, efficiency, comfort, and dining area image. The overall intentions of the modifications were (1) to establish a distinct crew dining "place" within the dominant total ship environment, (2) to transform the dynamic activity center into a quieter eating setting, and (3) to complement the pre-packaged, fast-food forward menu with an appropriate, integrated environmental "package."

Data from the survey given to users after implementation of these improvements indicated that 11 of the 13 questionnaire items related to the specific physical component modification received a greater positive occupant response (statistically significant). The two exceptions were items 8 and 14 (table size adequacy and finding a place to eat).

For the other 11 items, the results indicated that the physical component modifications made the crews' dining experiences more satisfactory. Four items reached the level of positive response that was considered "optimum" -- more than 60 percent; for these items, the previous responses (before implementation of improvements) had been only 20 to 40 percent positive. Three items that were initially between 22 percent and 31 percent positive reached a 50 percent level of positive response. Responses for the remaining four items showed a statistically significant improvement percentage, although less than half of the crew responded positively. Table 4 summarizes the occupant response results and provides a design guidance statement and recommendations for further shipboard use of the physical components.

For the five items dealing with the "climate" conditions of the messdeck compartments (2, 3, 4, 5, and 15), no specific physical component modifications were evaluated. However, light level satisfaction could have been impacted by possible "shadows" at the tables caused by the vision screens and the reduced reflectance of the darker overhead paint. The three items related to temperature and illumination brightness acceptability were not significantly different in occupant response. However, the two items dealing with the ventilation quality and a light level that was "too low" both showed a significantly more positive occupant response. These improvements in response were probably "halo" effect conditions (the men responded more positively to everything in general, since their total orientation to the messdeck experience had improved).

As expected, five of the seven items (7, 21, 22, 24, 25, 28, and 29) related to the crew attitudes toward dining per se were not significantly different for either messdeck condition. One exception was item 24, to which a statistically significantly greater number (46 percent

Table 4
Summary of Design Information Conclusions and Recommendations From
Saratoga Forward Messdeck Occupant Responses to Physical
Component Modifications

Item No.	Positive and Improvement %	Reliability Requirement	Physical Component Design Guidance	Conclusions and Suggestions U.S.S. Saratoga	Recommendations for Further Carrier Application
12	60% improved 40% from 20% before	Privacy	The dividers established a messdeck locale with apparent separation from the passageway traffic.	The vision dividers made a major difference in the total character of the Saratoga forward messdeck spaces by [1] isolating the diners from the passageway traffic and [2] creating a distinct dining space.	Any messdeck compartments that also serve as part of the fore-aft passageway systems should be designed to provide circulation so that those dining will not seem to be a part of the more dynamic circulation activity.
13	62% improved 38% from 21% before	Efficiency	Providing ample space around table and beverage service stations improves party access to their choices of salad and beverage selection by the necessary random circulation.	In an especially high-density dining environment, it is also especially important to have an efficient procedure to obtain the total meal, including the beverage, and having the various salad and beverage choices equally accessible.	The messdeck layout should be designed as a total environment for a systematic sequence of dining activities. Dining should not need to overcome a series of obstacles (thus delays in any of the particular parts of) the total experience.
16	63% improved 37% from 34% before	Image	Painting the overhead lighting and ceiling on dividers to cream, part of the bulkhead equipment items minimized the clutter and improved the gear in the messdeck compartments.	Controlling the apparent extent of the necessary messdeck overhead and bulkhead gear improves the messdeck image within the work compartments.	In order to establish a distinct character for a shipboard compartment, the clutter of piping and gear should be minimized within the constraints of emergency accessibility, low headroom, and multiple use of compartments.
10	66% improved 24% from 42% before	Image	All major visible furniture items (chairs, table cloths, and counter units) were color coordinated in order to minimize the diverse items with each other.	An acceptable, coordinated color selection for the messdeck and the dining furnishings can help establish a "sense of place" for the crew dining experiences.	All parts of the messdeck furnishings should be color-coordinated, with a strong vivid color related to the other parts of the messdeck area (serving line, deck, and bulkheads).

Table 4 (cont'd)

Item No.	Positive and Improvement % before	Usability Requirement	Physical Component Design Guidance	Conclusions and Suggestions U.S.: Saratoga	Recommendations for Further Carrier Application
11	52% Improved 19% from 27% before	Large	All messdeck compartment plastic shell chairs, including the 27 percent, were coordinated to be in- tegrated with the furni- ture items in blues, green, and white.	The strong color statement of the total messdeck environment was considered significant. The response is probably indicative that the blue color family used is not as "popular" for dining areas as the yellows and reds.	The total messdeck environment should be designed to include yellows, blues, greens, and reds in combination and would probably have the best universal acceptance. If there were no other color constraints.
9	52% Improved 27% from 25% before	Large	All messdeck furniture (lounge chairs, tables, and counter units) were purchased new and selected or designed to reflect a "new" condition.	Carrier messdeck furnishings receive extremely poor treatment and are replaced and repaired repeatedly, even relatively new items show more than normal use wear, so that just over half the sample responded positively.	Select shipboard messdeck furniture that will not show hard use, i.e., anodized metal rather than painted metal, "thru-color" chair backs and seats, "thru-color" table color, and repair requirements with on-board tool and workmanship capabilities.
1	52% Improved 19% from 31% before	Comfort	The reduction in the apparent extent of dynamic noise was noted in the negative noise impact in the messdeck compartments.	No specific sound attenuation materials were permitted on the test components, yet only 27 percent considered the compartments negatively noisy (and 50 percent in the "borderline" condition). Seeing fewer people and less movement probably also encourages each diner to lessen the level of their conversations at the tables.	The breakup of the larger mess-deck compartments into obvious smaller dining areas should be considered as a means of reducing sound-attenuating carpeting should be used on all reasonable vertical surfaces to help to reduce the decibel level as well.
17	42% Improved 21% from 17% before	Comfort	Changing from the rigid plastic shell chair to a more flexible, "formed" chair improved user satisfaction.	Similar improvement in user/occupant comfort response has been shown in other dining facility research. The only chair types that have received more than 70 percent positive response were the "formed" padded seats and backs, both of which impact the shipboard requirements for stackability and durability.	Messdeck area chairs should be selected for user comfort as well as necessary stack-ability and durability.

Table 4 (cont'd)

Item No.	Positive and Negative Requirements	Habitability Requirement	Physical Component Design Guidance	Conclusions and Suggestions U.S.S. Saratoga	Recommendations for Further Carrier Application
17	12% Improved 12% from 71% before	Privacy	Using visual screens to separate dining areas into smaller units improved user response to the distractions of the circulation traffic.	The carrier dining experience necessarily involves an element of "separation" from other activities. Also, separation of diners from each other should also be maximized.	Any panels or dividers used on mess tables should be designed to facilitate the "separation" of the dining areas from other activities. Also, separation of diners from each other should also be maximized.
21	12% Improved 12% from 20% before	Efficiency	Operating a fourth serving line and increasing the capacity of the forward messdecks by 80 improved the crew perception of waiting times.	The 32 percent positive response was somewhat less than the 40 percent "before" response for shore installations has been around 25 percent. Possibly the crew realized that all that physically could be done was being done. Staggered scheduling of groups would lessen the number available to eat at any one time.	Shipboard living for enlisted personnel is usually an extensive amount of time waiting in lines. Whatever can be done to shorten mess lines should be done, since these mess lines occur three times every day.
6	17% Improved 9% from 8% before	Privacy	Separating the areas with visual screens improved the occupants' perception of "crowdedness."	The high-density conditions of the forward messdecks cannot be modified further and still have the required number of places to eat. The maximum positive response for crowdedness is probably 10 to 20 percent units additional. Crowdedness can be reduced from 10 per seat. (Shore facilities are approximately 3 per seat.)	Crowdedness and finding a place to eat appear to be the major problems for carrier messdeck occupants. (74 percent and 73 percent, respectively, responded negatively to crowdedness.) The two factors are related, and could both be improved only by providing more space. Staggered scheduling of meals for different groups would help also.
8	65% decreased 10% from 15% before	Comfort	Changing all of the tables to four-person tables reduced the user acceptance from the 12% to 10% and the rectangular tables.	Consistent with previous occupant response, tables less than 400 sq in. are not acceptable. Positive evaluation in almost direct relation to their size. The "before" tables were 385 sq in. per person and were evaluated 76 percent positive. The "after" tables were 400 sq in. per person and were evaluated 66 percent positive. If more seats are available at the smaller size, it is probably a good tradeoff, since 66 percent positive is acceptable.	The size of table available per person is directly related to the total number of eating places available within the limited space for shipboard messdecks. The 325 sq in. tables are not acceptable. The "acceptable" size, even though for tables per sq. 400 sq in. per person is considered optimum.

Table 4 (cont'd)

Item No.	Positive and Improvement's	Feasibility Requirement	Physical Component Design Outline	Conclusions and Suggestions U.S.S. Strategic	Recommendations for Further Carrier Application
14	16% decreased weight from 17% before	Efficiency	The increase of forward messdeck area was 16% and the weight was decreased 17%. This was an opportunity to increase the capacity.	Even though the forward messdeck area capacity was increased (about 16%), the messdeck area was not chosen to eat there increased by approximately 100 percent. Since the physical size of the compartments is limited, other means, such as staggered meal-break times, should be evaluated.	Delay in finding a place to eat with sufficient food is probably considered the most frustrating condition of the messdeck; thus, even if it happens infrequently, it is recommended that the capacity is consistently less than the level of use (usually at the noon meal). Other means of regulating the level of messdeck use should be evaluated, such as a staggered schedule of meal-break times.

"after" vs. 32 percent "before") indicated they would like to have stand-up counters in the messdecks. Undoubtedly, this increase in the acceptance of counters was based either on their having been used when seats were not available, or because some persons realized that those using counters would not be competing for their "preferred" chairs. The other item (29) of this group in which there was a significant difference related to the crew's attitude about the desired number of people at their tables. In the "before" condition (all six- or seven-person tables), approximately 60 percent indicated a preference for three to five people, while approximately 30 percent indicated a preference for only one or two: i.e., a smaller group was desired by approximately half as many men as a larger group. In the "after" condition (all four-person tables, except for the essentially two-person counter units), the desire for a small group increased to approximately 50 percent, while the interest in the larger group dropped to 45 percent. In addition, those interested in tables for six or more persons dropped from 10 percent before to 4 percent after. It appears that most personnel feel that the four-person tables are optimum for their needs. However, it also appears that three or four six-person tables would be acceptable replacements for some four-person tables, especially if they would fit into spaces that are not now used; this would increase total capacity by six or eight persons.

For the remaining four items related to user general satisfaction (18, 20, 26, and 27), there were no statistically significant differences in the percentages or order of those factors that contribute most to "pleasant" and "unpleasant" conditions (items 26 and 27). The other persons at their tables and the meal itself accounted for 75 percent of the pleasant contributions in both the before and after conditions, whereas the messdeck activity level and the noise consistently accounted for approximately 60 percent of the unpleasant contributions in both conditions. The extensive reflective, membrane-type metal surfaces of the messdecks and a density requiring 6 or 7 seat turnovers per hour are the major reasons for such consistent evaluations.

Finally, the two items dealing with general messdeck satisfaction (18 and 20) were attempts to determine how the users evaluated the composite physical conditions of the forward messdeck both in comparison to their other shipboard environments (item 18) and as they impact their "enjoyment" of the meals (item 20). In the comparison to other "most used" environments, there was no difference in positive responses -- 5 percent each time -- probably because the other compartments are more obviously related to the individuals' space needs; e.g., their mess berths or workstations, as opposed to the maximum sharing of facilities and furnishings on the forward messdecks. Item 20, however, did show a statistically significant improvement in the crew's positive responses. The primary focus of the renovation design for the forward messdeck was oriented toward enabling the crew to enjoy their dining experiences. Initially, only 8 percent indicated that the forward messdeck conditions contributed to their dining enjoyment, while 61 percent felt the

conditions were a negative factor, and 31 percent were neutral. The "after" positive response increased to 34 percent and the neutral response increased to 43 percent; this indicates that 77 percent of the users do not consider the compartments a negative factor in their enjoyment of their meals. The 23 percent who still feel the messdeck compartments do not contribute to their meal enjoyment compares to approximately 16 percent of renovated shore installation⁵ dining facility occupants. In comparison to the 16 percent negative responses for the much less dense shore installation, the 23 percent Saratoga negative response is probably as close as possible, considering the greater shipboard constraints. Also, only 3.0 percent of the "after" Saratoga sample (in comparison to the 16.7 percent of the "before" Saratoga sample) remained "highly" negative; this is almost identical to the 2.4 percent that remained "highly" negative at the typical shore installation conditions. These responses indicate that the Saratoga forward messdeck is now considered either "acceptable" or "neutral" to the majority of shipboard personnel, and this was the goal of the design and modifications.

The habitability research described in this report was located only at the forward messdecks, since the Saratoga's comprehensive food service improvement program test was assigned (and thus confined) to that area. However, all of the existing conditions that define the design information described in Chapter 2 were also relevant to the aft messdeck compartments and similar spaces of other U.S. Navy aircraft carriers (Appendix E). With the increased use of the forward messdeck, the aft messdeck density (turnover per hour) has been reduced to approximately 5 from 7; thus, both mess areas are now "carrying their fair share" (approximately). All of the physical components modified in the forward area design solution (summarized in Table 4) should also be considered relevant for application to the aft area, with the expectation that such physical component modifications would produce similar user responses in terms of the four habitability requirements of efficiency, privacy, comfort, and image. The Food Service Officer felt that the screening and counter units held up extremely well during the initial year of usage.

⁵ R. L. Porter, et al., U.S. Marine Corps Interior Design Guide for Enlisted Personnel Dining Facilities, Technical Report E-150 (CERL, 1979).

APPENDIX A:
NATICK LABS GENERAL SURVEY QUESTIONNAIRE

FOOD SERVICE OPINION SURVEY

The Natick R & D Command has been asked by the Navy to study food service aboard carriers and to recommend improvements to the current food service. The customer should have a voice in the description of the current system and in recommendations for a new system. This is your opportunity to have a say in this study. In the past we have implemented recommendations made by customers in studies for the Navy (NAS Alameda), Air Force (TRAVIS AFB), and Army (Fort Lewis). Please take this survey seriously; we take your opinions seriously, so please read every question carefully, and give your honest answers.

You will notice that we have not asked for your name or social security number. Therefore, the answers you give us on this survey are confidential.

It is fairly clear how to answer most of the questions in this survey; you simply write in the correct numbers or circle the appropriate letters or numbers. Below there are examples of the three most common types of questions with some answers written in so you can see how to do it.

Example 1. The question below asks for a write-in answer. If you were 5 ft. 8 in. tall, you would write these numbers in as we have done.

Indicate your height. 5 feet 8 inches

Example 2. This question asks how satisfied you are with certain aspects of the Navy. If you were slightly satisfied with your supervisor, you would circle 5 next to supervisor. If you were very dissatisfied with your uniform, you would circle 1 next to uniform. If you were satisfied with your pay, you would circle 6 next to pay. Your questionnaire would look like this.

Tell us how satisfied or dissatisfied you are with these aspects of the Navy (Circle one number for each aspect)

	Very Satisfied	Satisfied	Slightly Satisfied	Neither Satisfied nor Dis- satisfied	Slightly Dis- satisfied	Dis- satisfied	Very Dis- satisfied
a. Supervisor	7	6	5	4	3	2	1
b. Uniform	7	6	5	4	3	2	1
c. Pay	7	6	5	4	3	2	1

Example 3. The following question asks your opinion of the general condition of your mess. Note that for each factor there are two words or phrases with opposite meanings and seven numbers in between. Your job is to circle the number which best describes your feelings. In the example below, assume your feelings about the chairs are right in the middle between too short and too tall (just about right in other words). You would circle the 4. Suppose you feel that the decks are moderately clean; you would circle 6 (the number under moderately and nearest clean). Finally, suppose you feel the glasses are slightly dirty; you would circle 5 since it is under slightly and nearest dirty. Your questionnaire would look like this.

For each pair of items below, please indicate your opinion of the general condition of your mess by circling the number which comes closest to describing your feelings.

	Extremely	Moderately	Slightly	Neutral	Slightly	Moderately	Extremely	
a. Chairs too short	1	2	3	4	5	6	7	Chairs too tall
b. Decks dirty	1	2	3	4	5	6	7	Decks clean
c. Glasses clean	1	2	3	4	5	6	7	Glasses dirty

On the right side of each sheet is a block for automatic data processing.
Please do not write in this right hand block.

Survey ID Number _____

1. SHIP CODE (To be supplied by testers.) _____

2. MESS CODE (To be supplied by testers.) _____

3. Are you a member of (circle one number)

- 1 Ship's company
- 2 Aircrew squadron
- 3 Marine detachment
- 4 Other

4. Circle the number which indicates your RACE

- 1 Caucasian/White
- 2 Negro/Black
- 3 Filipino
- 4 Mexican American
- 5 Other (specify) _____

5. Circle the number which indicates your MARRIAGE STATUS

- 1 Married
- 2 Single, Divorced, or Separated

6. Indicate your height. _____ feet _____ inches

7. Indicate your weight. _____ pounds

8. Circle the number which indicates WHERE YOU LIVE when your ship is in homeport.

- 1 On base bachelor quarters
- 2 On base family quarters
- 3 Off base bachelor quarters
- 4 Off base family quarters
- 5 On board ship

1
(1:1)

1:2-5

1:6

1:7

1:9

1:10

1:11

1:12-14

1:15-17

1:18

9. To how many ships (besides this one) have you been assigned/attached?

1:19-20

_____ ships

10. How many months have you been assigned/attached to this ship?

1:21-22

_____ months

11. Do you plan to REENLIST when your present enlistment ends? Circle the appropriate number.

1:23

1 Definitely yes

2 Probably yes

3 Undecided

4 Probably no

5 Definitely no

6 No, retiring

12. What are your FEELINGS ABOUT THE MILITARY SERVICE. Circle the appropriate number.

1:24

Dislike	Dislike	Dislike		Like	Like	Like
Very Much	Moderately a Little	Neutral	a Little	Moderately	Very Much	
1	2	3	4	5	6	7

13. Indicate how satisfied or dissatisfied you are with these aspects of the Navy. Please circle one number for each aspect.

	Very Satisfied	Slightly Satisfied	Neither Satisfied nor Dissatisfied	Slightly Dissatisfied	Dissatisfied	Very Dissatisfied
a. Travel	7	6	5	4	3	1
b. Pay	7	6	5	4	3	1
c. Food	7	6	5	4	3	1
d. Job	7	6	5	4	3	1
e. Benefits	7	6	5	4	3	1
f. Berthing	7	6	5	4	3	1
g. Friends	7	6	5	4	3	1
h. Training	7	6	5	4	3	1
i. Discipline	7	6	5	4	3	1

14. Circle your present grade.

E-1 E-2 E-3 E-4 E-5 E-6 E-7 E-8 E-9

1:34

15. In which ship's department do you work? Circle one number.

1:35-36

- 1 Supply
- 2 Engineering
- 3 Operations
- 4 Deck
- 5 Air
- 6 Marine detachment
- 7 Medical/Dental
- 8 Communications
- 9 Aircraft intermediate maintenance
- 10 Weapons
- 11 Administration
- 12 Other

16. On your last shore assignment did you receive a SEPARATE RATIONS ALLOWANCE (money instead of free meals)? Circle one number

1:37

- 1 Yes 2 No

17. Which three of these COOKING or SPECIALTY FOODS do you like best? Put the number 1 next to your most favorite, the number 2 next to your second most favorite, and the number 3 next to the third.

1:38-39

1:40-41

1:42-3

- | | |
|---------------------------------|------------------------------------|
| _____ 01 Chinese | _____ 10 Mexican |
| _____ 02 English | _____ 11 New England |
| _____ 03 French | _____ 12 Polish (& Eastern Europe) |
| _____ 04 General American Style | _____ 13 Soul |
| _____ 05 German | _____ 14 Southern |
| _____ 06 Greek | _____ 15 Spanish (not Mexican) |
| _____ 07 Italian | _____ 16 Seafood |
| _____ 08 Japanese | _____ 17 Filipino |
| _____ 09 Jewish | _____ 18 South Vietnamese |
| | _____ 19 Other (specify) _____ |

18. Concerning the degree of MILITARY ATMOSPHERE which you feel exists in your mess at the present time, indicate whether you feel there should be MORE or LESS military atmosphere in the future. Circle one number.

A Lot More	More	A Little More	About the Same	A Little Less	Less	A Lot Less
1	2	3	4	5	6	7

19. If you would like to see MILITARY ATMOSPHERE reduced in the mess how would you do it? Circle as many as you wish.

1. Make the mess look like a civilian cafeteria
2. Remove the Master-at-Arms
3. Do not enforce a dress code
4. Do not change it

20. How would you rate the mess on this ship in comparison to other ship's messes in which you have eaten? Circle one number.

The mess is:

This is my First Ship	Much Worse	Worse	Slightly Worse	No Better or Worse	Slightly Better	Better	Much Better
0	1	2	3	4	5	6	7

21. How would you rate the mess on this ship in comparison to SHORE messes in which you have eaten? Circle one number.

The mess is:

Much Worse	Worse	Slightly Worse	No Better or Worse	Slightly Better	Better	Much Better
1	2	3	4	5	6	7

22. For each pair of items below, please indicate your opinion of the GENERAL CONDITION OF YOUR MESS by circling the number which comes closest to describing your feelings.

	Extremely Moderately Slightly	Neutral	Slightly Moderately Extremely	
a. Too brightly lighted	1 2 3 4 5 6 7			Too dimly lighted
b. Attractive appearance	1 2 3 4 5 6 7			Unattractive appearance
c. Quiet	1 2 3 4 5 6 7			Noisy
d. Overcrowded	1 2 3 4 5 6 7			Uncrowded
e. Comfortable chairs	1 2 3 4 5 6 7			Uncomfortable chairs

1:44

1:45

1:46

1:47

1:48

1:49

1:50

1:51

1:52

1:53

1:54

1:55

23. What do you prefer to eat from? Please place the number 1 next to the dinnerware you prefer most, place the number 2 next to your second choice, the number 3 next to your third choice, and the number 4 next to your last choice.

_____ metal tray with compartments
 _____ plastic tray with compartments
 _____ china dishes
 _____ paper dishes

24. Circle the table size you prefer.

2 persons	4 persons	6 persons	8 persons	more than 8 persons
1	2	3	4	5

25. What is your reaction to having MUSIC on the mess decks?

Very Accept- able	Accept- able	Mildly Accept- able	Neutral	Mildly Unaccept- able	Unaccept- able	Very Unaccept- able
1	2	3	4	5	6	7

26. Indicate the THREE types of music you would most prefer in the dining facilities. Circle up to 3 numbers.

1. Any type is fine
 2. Hard rock
 3. Soul
 4. Popular
 5. Rock and roll
 6. Jazz
 7. Instrumental
 8. Classical
 9. Country western
 10. Other (write it here _____)
 11. Do not want music

27. How do you feel about waiting in the serving line for food? Circle one number.

1. I find it bothersome because I have a heavy work schedule.
 2. I find it bothersome because I could be doing other things.
 3. I don't mind; it's better than working.
 4. I don't mind; I usually have enough time.
 5. Sometimes it bothers me; other times I don't mind.

1:56

1:57

1:58

1:59

1:60

1:61

1:62-3

1:64-5

1:65-6

1:67

28. Other than times of dieting do you ever leave your mess without enough to eat? Circle one number

Almost Never 1	Not Often 2	Sometimes 3	Often 4	Almost Always 5
----------------------	-------------------	----------------	------------	-----------------------

1:63

29. Are you currently on a diet to lose or maintain weight? Circle one

Yes No

1:69

30. Does the ship offer a low calorie meal for people who want to diet? Circle one number.

Almost Never 1	Not Often 2	Sometimes 3	Often 4	Almost Always 5
----------------------	-------------------	----------------	------------	-----------------------

1:70

31. In your opinion, what would be the fairest way of providing seconds? The person wanting seconds should (circle one number)

1. go to the head of the line
2. alternate entering the head of the line with persons already in line
3. go to the end of the line
4. wait until everyone is served
5. seconds should not be offered

1:71

32. For each of the following foods, indicate your opinion of the amount given in one serving. Circle one number for each type of food.

	Much Too Small	Too Small	Slightly Too Small	Just Right	Slightly Too Large	Too Large	Much Too Large
a. Meat	1	2	3	4	5	6	7
b. Starches (Potato, Rice, Bread, etc.)	1	2	3	4	5	6	7
c. Vegetables	1	2	3	4	5	6	7
d. Dessert	1	2	3	4	5	6	7

1:72

1:73

1:74

1:75

33. What three new mess types would you most like to see on the ship?
Put the number 1 next to your most favorite, the number 2 next to
your second most favorite, and the number 3 next to the third.

- 1. Hamburgers
- 2. Hot dog/Polish sausage
- 3. Pizza
- 4. Mexican food
- 5. Fish and chips
- 6. Grinders/Submarine sandwiches
- 7. Spaghetti/Ravioli
- 8. Sandwiches
- 9. Vending machines (sandwiches, milk, dessert)
- 10. Barbecue
- 11. Wealth foods
- 12. Vegetarian
- 13. Other (specify) _____

34. If we could introduce one new food outlet on the ship, where should it
be located to be most convenient for you? Circle one number.

- 1. Hangar deck (main deck)
- 2. Above Hangar deck but below flight deck
- 3. Close to flight deck
- 4. In the island (superstructure)
- 5. 2nd Deck
- 6. 3rd Deck
- 7. 4th Deck or below.

35. Should this new food facility be (circle one number)

- 1. Aft
- 2. Foreward
- 3. Amidships

36. How would you like a food facility with stand-up counters for easy to
eat foods? Circle one number for each meal.

	Like Greatly	Like Moderately	Like Slightly	Neither	Dislike Slightly	Dislike Moderately	Dislike Greatly
a. Breakfast	7	6	5	4	3	2	1
c. Lunch	7	6	5	4	3	2	1
d. Dinner	7	6	5	4	3	2	1

Card 2
2 in
Col 1
Dup 2-7

2:9-10

2:11-12

2:13-14

2:15

2:16

2:17
2:18
2:19

37. We would like you to tell us how important the following factors are in influencing what foods you choose to eat aboard ship, using the following scale.

1	2	3	4	5	6	7
Of No	Of Little	Of Some	Of Con-	Of High	Of Very	Of Highest
Importance	Importance	Importance	siderable	Importance	High	Importance
			Importance		Importance	

For each of the factors listed below, please circle the number from this scale which best describes your opinion of its importance.

	How important?						
a. Food appearance	1	2	3	4	5	6	7
b. Food variety	1	2	3	4	5	6	7
c. Familiarity with the food	1	2	3	4	5	6	7
d. Nutritional value of the food	1	2	3	4	5	6	7
e. Number of calories in the food	1	2	3	4	5	6	7
f. Your liking of the food	1	2	3	4	5	6	7
g. How well the food goes with other foods you choose	1	2	3	4	5	6	7
h. How hungry you are	1	2	3	4	5	6	7

2:27
2:21
2:22
2:21
2:24
2:25
2:26
2:27

38. Should there be (circle one number for each)

	Yes	No
a. Dress regulation on the messdeck	1	2
b. Smoking allowed on the messdeck	1	2
c. 1st class permitted to eat in line	1	2
d. Separate 1st class seating area	1	2
e. Special smoking area on messdeck	1	2

2:28
2:29
2:30
2:31
2:32

39. How well does the messdeck master-at-arms do his job in each of the following categories? Circle one number for each category.

	Very Well	Well	Slightly Well	Neither Well nor Poorly	Slightly Poorly	Poorly	Very Poorly
a. Makes mess deck pleasant place to eat	7	6	5	4	3	2	1
b. Monitors waiting line	7	6	5	4	3	2	1
c. Controls head of line privileges	7	6	5	4	3	2	1
d. Maintains order	7	6	5	4	3	2	1
e. Supervises mess cooks	7	6	5	4	3	2	1

2:33
2:34
2:35
2:36
2:37
2:38

40. How often is the food in your mess (Circle one number for each category)

	Almost Never	Not Often	Sometimes	Often	Almost Always
a. Overcooked	1	2	3	4	5
b. Undercooked	1	2	3	4	5
c. Cold	1	2	3	4	5
d. Tasteless or bland	1	2	3	4	5
e. Burned	1	2	3	4	5
f. Dried out	1	2	3	4	5
g. Greasy	1	2	3	4	5
h. Tough	1	2	3	4	5
i. Too spicy	1	2	3	4	5
j. Raw	1	2	3	4	5
k. Still frozen	1	2	3	4	5
l. Too salty	1	2	3	4	5
m. Full of gristle	1	2	3	4	5
n. Spoiled	1	2	3	4	5
o. Stale	1	2	3	4	5
p. Fatty	1	2	3	4	5

41. For each pair of items below, please describe the mess cooks in your mess.
Circle a number for each pair.

	Extremely	Moderately	Slightly	Neutral	Slightly	Moderately	Extremely	
a. Clean	1	2	3	4	5	6	7	Dirty
b. Unpleasant	1	2	3	4	5	6	7	Pleasant
c. Hard Working	1	2	3	4	5	6	7	Not Hard Working
d. Provide Slow Service	1	2	3	4	5	6	7	Provide Fast Service

42. Indicate your opinion about the ATTITUDES of the Mess Cooks to make your meal as pleasant as possible. Circle one number.

Very Poor	Average	Very Good
1	2 3 4 5	6 7

2:39
2:40
2:41
2:42
2:43
2:44
2:45
2:46
2:47
2:48
2:49
2:50
2:51
2:52
2:53
2:54

2:55
2:56
2:57
2:58
2:59

43. For each pair of items below, please describe the cooks in the galley to Circle a number for each pair.

	Extremely	Moderately	Slightly	Neutral	Slightly	Moderately	Extremely	
a. Clean	1	2	3	4	5	6	7	Dirty
b. Unpleasant	1	2	3	4	5	6	7	Pleasant
c. Well Trained	1	2	3	4	5	6	7	Poorly Trained
d. Hard Working	1	2	3	4	5	6	7	Not Hard Working

2:60
2:61
2:62
2:63

44. Indicate your opinion about the ATTITUDES of the cooks in the galley to make your meal as pleasant as possible. Circle one number

Very Poor Average Very Good
1 2 3 4 5 6 7

2:64

Questions 1-44 dealt with a wide range of topics. For the remaining questions (45-59), please answer the question based on your experience of when the ship is IN PORT. Answer each question considering all the problems and advantages of being in port rather than being underway. Remember, these questions refer to the IN PORT situation.

45. How would you describe the ship's enlisted mess? For each area indicate your opinion of your mess by circling a number.

Area or topic	Very Bad	Bad	Neither		Slight- ly Good	Good	Very Good	
			Slight- ly Bad	Bad nor Good				
a. Convenience of location	1	2	3	4	5	6	7	3:9
b. General mess environment	1	2	3	4	5	6	7	3:10
c. Degree of military atmosphere present	1	2	3	4	5	6	7	3:11
d. Chance to sit with friends	1	2	3	4	5	6	7	3:12
e. Sanitation on messdecks	1	2	3	4	5	6	7	3:13
f. Hours of operation	1	2	3	4	5	6	7	3:14
g. Monotony of same facility	1	2	3	4	5	6	7	3:15
h. Quality of food	1	2	3	4	5	6	7	3:16
i. Quantity of food	1	2	3	4	5	6	7	3:17
j. Service by dining facility personnel	1	2	3	4	5	6	7	3:18
k. Variety of food	1	2	3	4	5	6	7	3:19
l. Speed of service or lines	1	2	3	4	5	6	7	3:20

46. How often is your meal: (Circle one number for each category.)

	Almost Never	Not Often	Some- times	Often	Almost Always
a. Too cold	1	2	3	4	5
b. Too warm	1	2	3	4	5
c. Stuffy	1	2	3	4	5
d. Smoky (cigarette, cigar)	1	2	3	4	5
e. Full of steam	1	2	3	4	5
f. Full of unpleasant food odors	1	2	3	4	5
g. Too windy	1	2	3	4	5
h. Full of fuel smells	1	2	3	4	5

3:21

3:22

3:23

3:24

3:25

3:26

3:27

3:28

47. How often do you find: (Circle one number for each category.)

	Almost Never	Not Often	Some- times	Often	Almost Always
a. Inappropriate or missing silverware	1	2	3	4	5
b. Not enough condiments (ketchup, salt, pepper)	1	2	2	2	2
c. Salad bar has run out of items	1	2	3	4	5
d. Not enough trays	1	2	3	4	5
e. Not enough dishes	1	2	3	4	5
f. Napkins missing	1	2	3	4	5
g. No ice	1	2	3	4	5
h. Menu substitutes	1	2	3	4	5
i. No milk	1	2	3	4	5
j. No other cold drinks	1	2	3	4	5
k. No coffee	1	2	3	4	5
l. No other hot drinks	1	2	3	4	5

3:29

3:30

3:31

3:32

3:33

3:34

3:35

3:36

3:37

3:38

3:39

3:40

48. How often do you see the following problems: (Circle one answer for each factor.)

	Almost Always	Often	Some- times	Not Often	Almost Never	
a. Heavy through traffic	1	2	3	4	5	3:41
b. Insects	1	2	3	4	5	3:42
c. Dirty serving counters	1	2	3	4	5	3:43
d. Dirty dispensing devices	1	2	3	4	5	3:44
e. Dirty silverware	1	2	3	4	5	3:45
f. Dirty trays	1	2	3	4	5	3:46
g. Dirty dishes	1	2	3	4	5	3:47
h. Dirty glasses	1	2	3	4	5	3:48
i. Dirty docks	1	2	3	4	5	3:49
j. Dirty tables	1	2	3	4	5	3:50
k. Excessive traffic	1	2	3	4	5	3:51
l. Bomb handling on messdeck	1	2	3	4	5	3:52
m. Loud people on messdeck	1	2	3	4	5	3:53

49. Do you generally sit with your friends when you eat? (Circle one number.)

1. Yes.
2. No, I don't want to.
3. No, there are not enough seats.
4. No, we eat at different times.
5. No, for some other reason.

3:54

50. How long does it take you to walk to the chow line for each meal? Write in the number for each meal. Leave the space blank if you do not eat the meal.

It takes _____ minutes at breakfast.
 It takes _____ minutes at the midday meal.
 It takes _____ minutes at the evening meal.

_____ 3:55-56
 _____ 3:57-58
 _____ 3:59-60

51. How long do you usually wait in the serving line before you get your food? Write 0 if you do not wait and leave the space blank if you do not eat the meal.

I wait _____ minutes at breakfast.
 I wait _____ minutes at the midday meal.
 I wait _____ minutes at the evening meal.

_____ 3:61-62
 _____ 3:63-64
 _____ 3:65-66

52. How long do you have to wait for a seat after you have taken your meal at the serving line? Write 0 if you do not wait and leave the space blank if you do not eat the meal.

I wait _____ minutes at breakfast.
 I wait _____ minutes at the midday meal.
 I wait _____ minutes at the evening meal.

_____ 3:67-68
 _____ 3:69-70
 _____ 3:71-72

53. How long do you have to wait in the scullery line to leave your dinnerware after you have finished eating? Write 0 if you do not wait and leave the space blank if you do not eat the meal.

I wait _____ minutes at breakfast.
 I wait _____ minutes at the midday meal.
 I wait _____ minutes at the evening meal.

_____ 3:73-74
 _____ 3:75-76
 _____ 3:77-78

54. What, in your opinion, would be the best ways of reducing the waiting times in line? Circle TWO of the following numbers.

1. More emphasis on speed-line (fast-food) items.
2. Set up strict schedules when various departments can eat.
3. Set up another serving line.
4. Put more tables on the messdecks.
5. Stay open longer hours.
6. Have take-out items.
7. Start a new food outlet in another part of the ship.
8. Limit the time at the tables so there is always a place to sit.
9. Do not have any self-serve items in the line.
10. Make sure the serving line does not run out of food.

Card 4
4 in Col 1
Dup Col 2-7

4:9-10

4:11-12

55. If carry-out food were available, how often would you use that service at breakfast, midday meal, and evening meal? Please put one check mark in the appropriate box under each meal.

- a. b. c.
- Break- Midday Evening
- fast Meal Meal
5. Every day
4. Every other day
3. At least once a week
2. At least once a month
1. Never

	Break- fast	Midday Meal	Evening Meal
5. Every day			
4. Every other day			
3. At least once a week			
2. At least once a month			
1. Never			

a. 4:16

b. 4:17

c. 4:18

56. How many meals do you usually miss because of your work each week? Please write the number of missed meals next to breakfast, midday and evening meals.

- a. Breakfast
- b. Midday meal
- c. Evening meal

4:16

4:17

4:18

57. At what time would you like the mess to open and to close?
Use the military 24-hour clock and write in numbers for each meal.

	<u>Open</u>	<u>Close</u>
a. Weekday breakfast	_____	_____
b. Weekday midday meal	_____	_____
c. Weekday evening meal	_____	_____
d. Weekday midrats	_____	_____
e. Weekend breakfast	_____	_____
f. Weekend midday meal	_____	_____
g. Weekend evening meal	_____	_____
h. Weekend midrats	_____	_____

Card 5
5 in col 1
Dup col
2-7

4: 19-26

4: 27-34

4: 35-42

4: 43-50

4: 51-58

4: 59-66

4: 67-74

4: 75-78

5: 9-12

58. Indicate your opinion of the VARIETY of food at an average
WEEKDAY meal. Do you have enough to select from at that meal?

	Much More Choice	More Choice	Slight- ly More Choice	Choice Enough	Slight- ly Less Choice	Less Choice	Much Less Choice
a. For short order foods	1	2	3	4	5	6	7
b. For meats	1	2	3	4	5	6	7
c. For starches	1	2	3	4	5	6	7
d. For vegetables	1	2	3	4	5	6	7
e. For salads	1	2	3	4	5	6	7
f. For beverages	1	2	3	4	5	6	7
g. For desserts	1	2	3	4	5	6	7

5:13

5:14

5:15

5:16

5:17

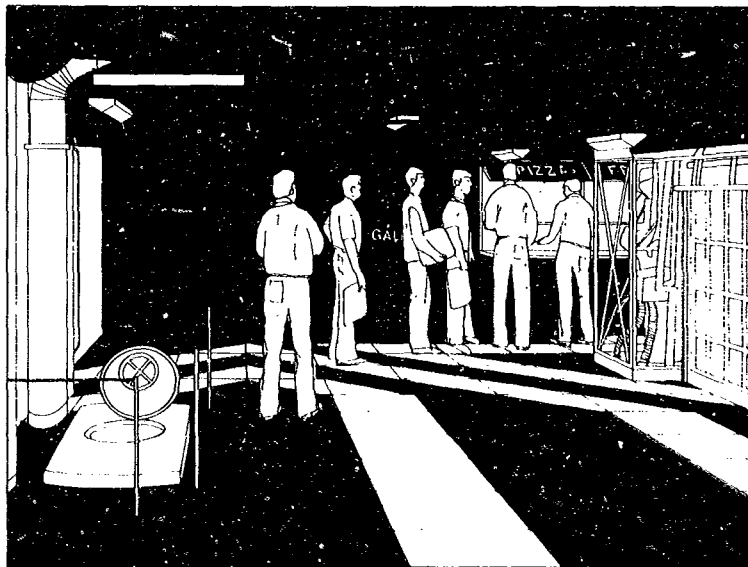
5:18

5:19

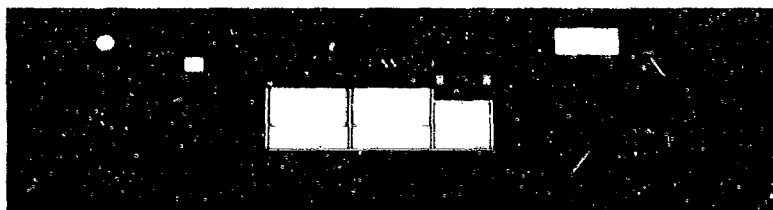
59. Indicate your opinion of the VARIETY of foods offered in the menu during the course of several weeks. Do your choices change enough from day to day?

	Much More Choice	More Choice	Slight- ly More Choice	Choice Not Enough	Slight- ly Less Choice	Less Choice	Much Less Choice	
a. For short order foods	1	2	3	4	5	6	7	5:20
b. For meats	1	2	3	4	5	6	7	5:21
c. For starches	1	2	3	4	5	6	7	5:22
d. For vegetables	1	2	3	4	5	6	7	5:23
e. For salads	1	2	3	4	5	6	7	5:24
f. For beverages	1	2	3	4	5	6	7	5:25
g. For desserts	1	2	3	4	5	6	7	5:26

APPENDIX B:
DESIGN DRAWINGS



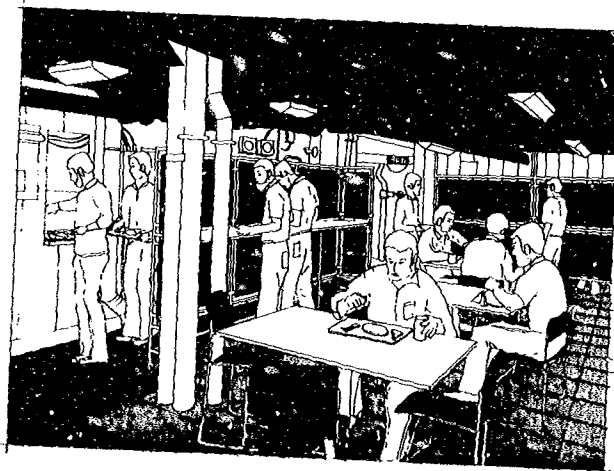
stbd. perspective



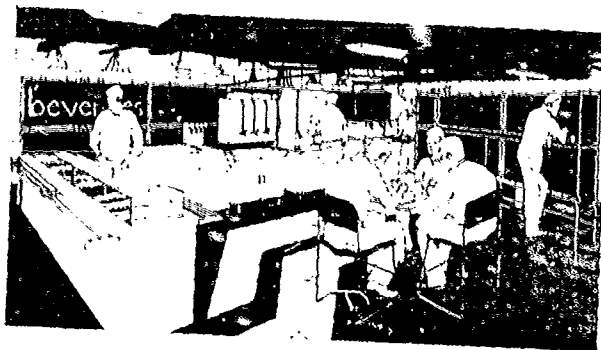
stbd. elevation

USS Saratoga

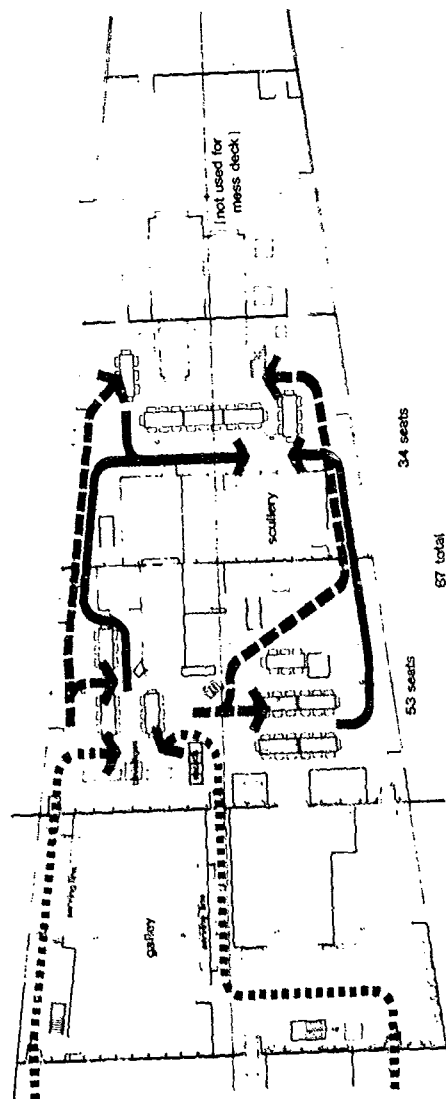
forward mess deck



forward mess deck

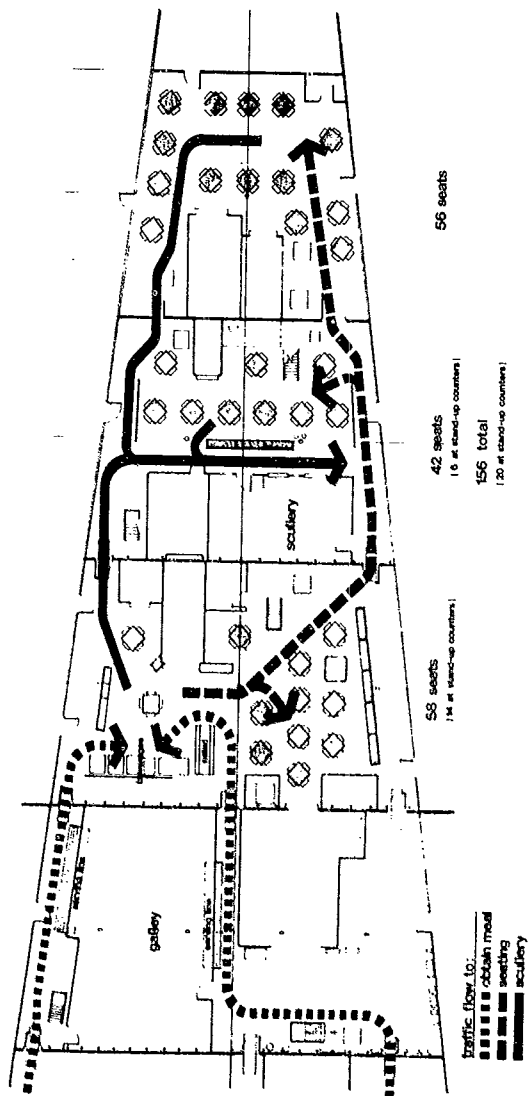


forward mess deck



USS Saratoga CV-60

forward mess deck
before condition



USS Saratoga CV-60

U.S. NAVAL ARCHITECTURE

forward mess deck
after condition

APPENDIX C:
CERL SPECIFIC QUESTIONNAIRE

"NAVY AFLQAT" FOOD SERVICE IMPROVEMENT PROGRAM

The U.S.S. Saratoga has been selected as the test location to evaluate several improvements for U.S. Navy Shipboard food service. It is intended that this forward mess deck will be modified early in 1978 as part of the project. The purpose of the following questionnaire is to obtain an evaluation of this mess deck by the current users. While some of the questions may seem different than others you have been asked about eating, please think about them and answer as honestly as you can. There are no right or wrong answers to the questions; rather, your responses should be an expression of your own feelings.

PERCENTAGES

	Highly Agree	Agree	No Opinion	Disagree	Highly Disagree
1. The <u>noise</u> level in this mess deck is so loud that it bothers you.	11.6	38.2	19.5	28.8	1.9
2. The temperature in this mess deck is usually so <u>hot</u> that it bothers you.	.8	5.6	19.9	67.5	6.2
3. The temperature in this mess deck is usually so <u>cold</u> that it bothers you.	1.2	7.7	20.7	66.0	4.3
4. The amount of light is so <u>low</u> that it bothers you.	1.9	9.4	17.4	66.5	4.8
5. The amount of light is so <u>bright</u> that it bothers you.	.6	3.6	20.0	68.9	6.9
6. You usually feel <u>crowded</u> in this mess deck.	39.1	48.7	4.6	7.5	.2
7. It is important for you to be able to <u>get by yourself</u> when you want to.	20.5	29.7	27.2	20.1	2.5
8. The <u>size</u> of the tables is adequate for your dishes and/or tray.	6.0	69.8	7.9	13.4	2.9
9. The <u>condition</u> of the furniture (tables and chairs) is excellent.	1.9	23.4	30.1	35.3	9.3
10. The <u>color</u> of the dining furniture (table tops and chair cushions) is very satisfactory.	2.5	38.9	34.2	17.4	7.0
11. The <u>colors</u> used throughout this mess deck (tile, bulkheads, overhead) are drab.	17.3	34.4	26.7	20.0	1.7
12. This mess deck has an adequate number of dividers that separate you from other activities here.	2.7	17.5	12.5	40.0	27.3
13. This mess deck is arranged so that you can get your food and drinks <u>easily</u> .	2.1	24.4	8.3	45.0	20.2
14. It is easy to find a place to sit once you have your food and drinks.	2.1	15.4	10.6	28.4	23.4
15. The air <u>quality</u> (ventilation) in this mess deck is so bad that it bothers you.	4.8	15.8	25.6	50.3	3.5
16. There are so many pipes, valves, ducts, furniture, checkered tile, etc. that the <u>visual distraction</u> bothers you while you eat.	14.3	23.0	26.5	32.7	3.5

TURN OVER -----

- | | Highly Agree | Agree | No Opinion | Disagree | Highly Disagree |
|---|--------------|-------|------------|----------|-----------------|
| 17. There are so many people milling and walking around that it bothers you while you eat. | 12.2 | 31.2 | 23.5 | 31.2 | 1.8 |
| 18. This mess deck is so <u>pleasant</u> to be in (not just for eating) that you would rather be here than in your berthing quarters or duty station. | 1.0 | 3.7 | 15.8 | 50.1 | 29.4 |
| 19. The <u>chairs</u> in this mess deck are very comfortable. | 2.0 | 38.3 | 31.0 | 23.1 | 5.5 |
| 20. The <u>physical surrounds</u> in this mess deck (colors, furniture, texture, etc.) make your meals more enjoyable. | 2.8 | 31.2 | 43.2 | 19.7 | 3.0 |
| 21. It is really the <u>people</u> , not the physical surrounds, that make your meals enjoyable. | 6.5 | 26.2 | 30.3 | 30.5 | 6.5 |
| 22. Other people waiting in the serving line and watching you eat doesn't really bother you. | 3.5 | 40.6 | 22.0 | 23.7 | 10.2 |
| 23. You never have to <u>wait</u> too long in the chow line. | 3.1 | 28.6 | 8.6 | 28.4 | 31.4 |
| 24. You like the idea of having a <u>stand-up counter</u> to eat at. | 5.5 | 40.5 | 21.6 | 18.7 | 13.6 |
| 25. It is important for you to be able to control who and when people sit at the same table with you while you eat. | 8.2 | 23.9 | 36.2 | 26.6 | 5.1 |
| 26. Which single item contributes most to making this mess deck a <u>pleasant place</u> to eat? (Select one) | | | | | |
| a. colors 8.4 | | | | | |
| b. furniture 5.6 | | | | | |
| c. noise level 6.9 | | | | | |
| d. the meal 39.2 | | | | | |
| e. the persons I eat with 34.3 | | | | | |
| f. the activity level 5.6 | | | | | |
| 27. Which single item contributes most to making this mess deck an <u>unpleasant place</u> to eat? (Select one) | | | | | |
| a. colors 1.8 | | | | | |
| b. furniture 2.6 | | | | | |
| c. noise level 22.0 | | | | | |
| d. the meal 21.8 | | | | | |
| e. the persons I eat with 9.7 | | | | | |
| f. the activity level 42.1 | | | | | |
| 28. How many of your meals do you like to spend in relative private conversation with specific friends? | | | | | |
| a. 0-20% 12.9 | | | | | |
| b. 21-40% 16.0 | | | | | |
| c. 41-60% 23.9 | | | | | |
| d. 61-80% 24.3 | | | | | |
| e. 81-100% 23.0 | | | | | |
| 29. How many others do you <u>like</u> to have at your table? | | | | | |
| a. 0 2.7 | | | | | |
| b. 1 to 2 49.0 | | | | | |
| c. 3 to 4 44.8 | | | | | |
| d. 5 to 6 1.7 | | | | | |
| e. up to 7 1.7 | | | | | |
| 30. Are there any other comments you would like to make about this forward mess deck? | | | | | |

The following questions are extremely important in order to conduct a follow-up study when the renovation of this dining hall has been completed.

Age: _____ Grade (E-1 through E-9) _____

Meal: _____ morning _____ noon _____ evening

"NAVY AFLOAT" FOOD SERVICE IMPROVEMENT PROGRAM

The U.S.S. Saratoga has been selected as the test location to evaluate several improvements for U.S. Navy Shipboard food service. This forward mess deck was modified early in 1978 as part of the project. The purpose of the following questionnaire is to obtain any evaluation of this mess deck by the current users. While some of the questions may seem different than others you have been asked about eating, please think about them and answer as honestly as you can. There are no right or wrong answers to the questions; rather, your responses should be an expression of your own feeling.

PERCENTAGES

	Highly Agree	Agree	No Opinion	Disagree	Highly Disagree
1. The <u>noise</u> level in this mess deck is so loud that it bothers you.	4.9	22.3	23.7	45.8	3.2
2. The temperature in this mess deck is usually so <u>hot</u> that it bothers you.	.6	3.4	14.8	72.4	8.7
3. The temperature in this mess deck is usually so <u>cold</u> that it bothers you.	.4	5.9	17.6	70.4	5.7
4. The amount of light is so <u>low</u> that it bothers you.	.8	3.7	11.6	73.3	10.6
5. The amount of light is so <u>bright</u> that it bothers you.	1.0	4.1	13.5	72.4	9.0
6. You usually feel <u>crowded</u> in this mess deck.	29.9	44.0	9.2	16.7	.2
7. It is important for you to be able to <u>eat by yourself</u> when you want to.	12.3	31.5	28.2	24.9	3.1
8. The <u>size</u> of the tables is adequate for your dishes and/or tray.	4.1	62.4	7.8	21.0	4.7
9. The condition of the furniture (tables and chairs) is excellent.	6.3	45.5	25.7	18.8	3.7
10. The color of the dining furniture (table tops and chair cushions) is very satisfactory.	6.1	60.4	22.9	9.2	1.4
11. The <u>colors</u> used throughout this mess deck (tile, bulkheads, overhead) are drab.	3.5	18.5	25.9	47.7	4.5
12. This mess deck has an adequate number of dividers that separate you from other activities here.	3.3	56.9	12.1	21.1	6.7
13. This mess deck is arranged so that you can get your food and drinks <u>easily</u> .	4.5	58.3	8.7	24.8	3.7
14. It is easy to find a place to sit once you have your food and drinks.	1.4	14.6	11.3	42.7	29.9
15. The air quality (ventilation) in this mess deck is so bad that it bothers you.	2.3	10.5	17.0	63.1	7.2
16. There are so many pipes, valves, ducts, furniture, checkered tile, etc. that the <u>visual distraction</u> bothers you while you eat.	5.7	10.8	20.9	56.7	5.9

- | | Highly Agree | Agree | No Opinion | Disagree | Highly Disagree |
|--|--------------|-------|------------|----------|-----------------|
| 17. There are so many people willing and walking around that it bothers you while you eat. | 18.0 | 41.7 | 19.1 | 19.5 | 1.7 |
| 18. This mess deck is so pleasant to be in (not just for eating) that you would rather be here than in your berthing quarters or duty station. | 1.7 | 3.3 | 9.1 | 44.3 | 41.6 |
| 19. The chairs in this mess deck are very comfortable. | 1.3 | 17.5 | 26.7 | 37.2 | 17.3 |
| 20. The physical surrounds in this mess deck (colors, furniture, texture, etc.) make your meals more enjoyable. | .8 | 6.9 | 31.1 | 44.5 | 16.7 |
| 21. It is really the people, not the physical surrounds, that make your meals enjoyable. | 4.6 | 25.4 | 31.7 | 29.8 | 8.4 |
| 22. Other people waiting in the serving line and watching you eat doesn't really bother you. | 2.9 | 38.7 | 20.2 | 27.7 | 10.4 |
| 23. You never have to wait too long in the chow line. | 3.1 | 17.1 | 5.6 | 29.0 | 45.2 |
| 24. You like the idea of having a stand-up counter to eat at. | 6.3 | 25.9 | 29.1 | 23.6 | 15.0 |
| 25. It is important for you to be able to control who and when people sit at the same table with you while you eat. | 7.9 | 17.6 | 36.8 | 29.5 | 8.2 |
26. Which single item contributes most to making this mess deck a pleasant place to eat? (Select one)
- a. colors 5.0
 - b. furniture 4.3
 - c. noise level 7.6
 - d. the meal 37.4
 - e. the persons I eat with 38.0
 - f. the activity level 7.8
27. Which single item contributes most to making this mess deck an unpleasant place to eat? (Select one)
- a. colors 2.3
 - b. furniture 2.0
 - c. noise level 27.4
 - d. the meal 28.3
 - e. the persons I eat with 7.7
 - f. the activity level 32.4
28. How many of your meals do you like to spend in relative private conversation with specific friends?
- a. 0-20% 17.1
 - b. 21-40% 13.2
 - c. 41-60% 23.5
 - d. 61-80% 22.2
 - e. 81-100% 24.1
29. How many others do you like to have at your table?
- a. 0 2.4
 - b. 1 to 2 27.8
 - c. 3 to 4 59.3
 - d. 5 to 6 6.3
 - e. up to 7 4.2

The following questions are extremely important in order to conduct a follow-up study when the renovation of this mess deck has been completed.

Age: _____ Rate (E-1 through E-3) _____

Meal: _____ morning _____ noon _____ evening

How much longer will you be assigned to the Saratoga? _____

Would you be willing to complete an identical questionnaire following renovation? _____

Your name and organizational unit (please print): _____

== THANK YOU FOR YOUR COOPERATION ==

APPENDIX D:

VISION SCREEN/COUNTER UNIT DRAWINGS
FOR U.S.S. SARATOGA



[illegible]

APPENDIX E:
VISION SCREEN/COUNTER UNIT DRAWINGS
FOR U.S.S. RANGER

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ATTN: Facilities Engineers
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ATTN: Facilities Engineer
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Fort Benning
Fort Bliss
Carlisle Barracks
Fort Chaffee
Fort Dix
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Fort Gordon
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Fort Benjamin Harrison
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ATTN: Facilities Engineer
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NDM

ATTN: Facilities Engineer
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Fitzsimons Army Medical Center
Walter Reed Army Medical Center

USACC

ATTN: Facilities Engineer
Fort Huachuca
Fort Ritchie

MTNC

HQ, ATTN: MTNC-SA
ATTN: Facilities Engineer
Oakland Army Base
Bayonne MOT
Sunny Point MOT

US Military Academy

ATTN: Facilities Engineer

USAES, Fort Belvoir, VA

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HQ, XVIII Airborne Corps and
Ft. Bragg
ATTN: AFIA-FE-EE

HQ, 7th Army Training Command
ATTN: AETIG-DEH (5)

HQ USABEUR and 7th Army
ODCS/Engineer
ATTN: AEAEH-EH (4)

V Corps

ATTN: AETVDH (5)

VII Corps

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21st Support Command

ATTN: AEREH (5)

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AFE, 20 Inf Div
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AFE, Gp Humphreys
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AFE, Taegu

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USA Japan (USARJ)

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Porter, Robert L.
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II. Series: U.S. Army Construction Engineering Research Laboratory ;
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